

# Administració avançada del sistema operatiu GNU/Linux

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## Introducció

Els sistemes GNU/Linux han arribat a un grau de maduresa important que els fa vàlids per a integrar-los en qualsevol ambient de treball, des de l'escriptori del PC personal fins al servidor d'una gran empresa. L'objectiu principal d'aquest curs és introduir-nos en el món de l'administració dels sistemes GNU/Linux.

Aprendrem com proporcionar, des de GNU/Linux, els serveis necessaris per a diferents ambients d'usuaris i màquines. El camp de l'administració de sistemes és enorme, hi ha moltes tasques, molts problemes que cal tractar, cal tenir grans coneixements de maquinari i programari, i no és sobrer aplicar una mica de psicologia per a tractar amb els usuaris finals dels sistemes.

El curs no pretén abordar una distribució GNU/Linux particular, però se n'han escollit un parell per a tractar els exemples: Debian i Fedora Core. Respecte al camp de l'administració, s'intentarà gestionar des del nivell més baix possible, normalment l'indicador d'ordres i els fitxers de configuració. Es comentaran, en cada cas, eines de nivell més alt, però cal anar amb compte amb aquestes, ja que solen ser fortament dependents de la distribució utilitzada i fins i tot de la versió; a més, aquestes eines solen variar molt entre versions. L'administració de baix nivell sol ser molt més dura, però sabem què estem fent i on podem veure els resultats i, a més, ens aporta molts coneixements addicionals sobre les diferents tecnologies utilitzades.

La primera edició d'aquests materials es va fer al final del 2003, i per aquesta raó se n'han anat desenvolupant diferents edicions, que s'han treballat sobre les diferents versions de les distribucions Debian i Fedora disponibles fins al moment actual. D'aquestes distribucions cal destacar que, essencialment, no han canviat en els aspectes bàsics d'administració però sí que han inclòs noves opcions, mòduls, versions del nucli, modes de configuració, etc. La distribució Debian és un paradigma dins del moviment del programari lliure, ja que no pertany a cap empresa i està confeccionat només per les aportacions dels voluntaris distribuïts arreu del món. Debian, a més, integra exclusivament programari lliure (se'n pot afegir d'altre apart). Per altra banda, Fedora és la distribució que té, a més de la seva comunitat, el suport d'una de les empreses més solvents del panorama comercial (Red Hat), i, potser per això, és la que ofereix més suport en l'àmbit empresarial (mitjançant serveis de pagament). A Debian el suport depèn dels voluntaris i del coneixement compartit dels usuaris.

Com que l'administració de sistemes és un camp molt ampli, aquest manual només pretén introduir-nos en aquest apassionant (i com no, també de ve-

gades frustrant) món. Veurem algunes de les tasques típiques i com tractar els diferents problemes, si bé l'administració és un camp que s'aprèn dia a dia, amb l'esforç continuat. I des d'aquí advertim que aquest manual és un treball obert, que amb els seus encerts i els més que probables errors, es pot veure complementat amb els comentaris de seus (patidors) usuaris, de manera que són benvinguts els comentaris i els suggeriments de qualsevol tipus per a la millora dels materials. Aquesta última adaptació es fa sobre una nova estructura del màster adaptat a l'Espai Europeu d'Educació Superior (EEES), que l'adequa a les noves metodologies d'aprenentatge, de conformitat amb la normativa vigent d'àmbit estatal.

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## Continguts

### Mòdul didàctic 1

#### **El nucli Linux**

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1. El nucli del sistema GNU/Linux
2. Personalització o actualització del nucli
3. Procés de configuració i compilació
4. Aplicació de pedaços del nucli
5. Mòduls del nucli
6. Virtualització en el nucli
7. Futur del nucli i alternatives
8. Taller de configuració del nucli a las necessitats de l'usuari

### Mòdul didàctic 2

#### **Administració de servidors**

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1. Administració de servidors
  - 1.1. Sistema de noms de domini (*domain name system, DNS*)
  - 1.2. NIS (YP)
  - 1.3. Serveis de connexió remota: telnet i ssh
  - 1.4. Serveis de transferència de fitxers: FTP
  - 1.5. Serveis d'intercanvi d'informació a nivell d'usuari
  - 1.6. *Internet Message Access Protocol* (IMAP)
  - 1.7. Grups de discussió
  - 1.8. *World Wide Web* (httpd)
  - 1.9. Servidor de WebDav
  - 1.10. Servei de *proxy*: Squid
  - 1.11. OpenLdap (Ldap)
  - 1.12. Serveis d'arxius (NFS, *Network File System*)
  - 1.13. Servidor de wiki
  - 1.14. Gestió de còpies de seguretat (*backups*)

### Mòdul didàctic 3

#### **Administració de dades**

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1. Administració de dades
  - 1.1. PostgreSQL
  - 1.2. El llenguatge SQL
  - 1.3. MySQL
  - 1.4. Source Code Control System (CVS i Subversion)

Mòdul didàctic 4

### **Administració de seguretat**

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1. Tipus i mètodes dels atacs
2. Seguretat del sistema
3. Seguretat local
4. SELinux
5. Seguretat en xarxa
6. Detecció d'intrusions
7. Protecció mitjançant filtratge (*TCP wrappers* i tallafocs)
8. Eines de seguretat
9. Anàlisi de registres
10. Taller: anàlisi de la seguretat mitjançant eines

Mòdul didàctic 5

### **Sintonització, optimització i alta disponibilitat**

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1. Sintonització, optimització i alta disponibilitat
  - 1.1. Aspectes bàsics
  - 1.2. Monitoratge
  - 1.3. Alta disponibilitat en Linux (*high-availability Linux*)

Mòdul didàctic 6

### **Clusterització**

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1. Clusterització
  - 1.1. Virtualització
  - 1.2. Beowulf
  - 1.3. Beneficis del còmput distribuït
  - 1.4. Memòria compartida. Models de fils (*threading*)
  - 1.5. OpenMP
  - 1.6. MPI, *Message Passing Interface*
  - 1.7. Rocks Cluster
  - 1.8. Monitoratge del clúster
  - 1.9. Introducció a la metacomputació o la computació distribuïda o en reixeta

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